

NON-PUBLIC?: N
ACCESSION #: 8906120260
LICENSEE EVENT REPORT (LER)

FACILITY NAME: H.B. ROBINSON STEAM ELECTRIC PLANT,
UNIT NO. 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000261

TITLE: SAFETY INJECTION/REACTOR TRIP DUE TO INADVERTENT TURBINE
DC
POWER SUPPLY ELECTRICAL SHORT
EVENT DATE: 02/27/89 LER #: 89-004-01 REPORT DATE: 06/02/89

OPERATING MODE: N POWER LEVEL: 030

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: C.T. BAUCOM, SENIOR SPECIALIST TELEPHONE: (803)383-1253

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED:
No

ABSTRACT:

On February 27, 1989, at 1617 hours, Unit 2 received a Safety Injection signal and, subsequently, an automatic reactor trip from 30 percent power when the turbine experienced a momentary loss of load. At the time, Maintenance personnel were investigating a power supply trouble alarm in the turbine control system when a technician inadvertently caused a short circuit, causing the governor valves to close. The steam dump system responded. When the electrical short was corrected, the governor valves reopened, resulting in high steam flow, but the steam dump valves had not modulated closed and a Safety Injection signal was initiated on high steam flow with low steam line pressure/low average reactor coolant temperature. The technician who caused the short found that the multimeter being used was wrongly configured to measure amperage versus voltage. This had apparently created the short in the turbine DC power supply. The licensee declared an Unusual Event at 1618 hours, then terminated the Event at 1651 hours, and Unit 2 was returned to power

operations on February 28, 1989. The cause of the event has been attributed to inattentiveness by the maintenance technician to the configuration of the multimeter. Plant safety was maintained throughout the event. The problem of improper steam dump valve modulation was the result of the saturation of the steam dump signal summator. This summator was replaced and tested with satisfactory results. Parts have been ordered and will be installed which will upgrade the circuit by reducing the susceptibility to failure by saturation. This should preclude the occurrence of future problems related to saturation of this signal summator. This Licensee Event Report is submitted in accordance with 10CFR50.73(a)(2)(iv).

END OF ABSTRACT

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I. Description of Event

On Monday, February 27, 1989, at 1617 hours, Unit 2 received a Safety Injection (SI) signal and, subsequently, an automatic reactor trip when the turbine experienced a momentary loss of load.(1) The unit was operating at 30% power, approximately 175 MWe net. At the time, Maintenance personnel were investigating an Electro-Hydraulic (E-H) power supply trouble alarm in the turbine control system when a technician inadvertently caused a short circuit on one of the E-H power supplies. The shorted power supply caused the turbine governor valves to momentarily close. The steam dump system responded to remove heat and provided artificial load while the governor valves were closed. When the short was removed, the governor valves re-opened resulting in a high steam flow condition. However, the steam dump valves had not modulated closed to prevent the Reactor Coolant System (RCS) from reaching a low Tave condition, thus resulting in the SI actuation signal (i.e., high steam flow with low steam line pressure or low Tave). Upon discovering that the Plant had tripped, the technician suspected that the test instrument may have been involved. This was confirmed when he discovered that he had mistakenly configured the multimeter to check amperage versus voltage. In this configuration the instrument responded similar to a short-to-ground on the turbine DC power supply. At 1618 hours an Unusual Event was declared in accordance with the Plant Emergency Plan and the NRC was notified. The Unusual Event was terminated at 1651 hours. The Plant returned to power on February 28, 1989.

II. Cause of Event

The event was caused by a Maintenance technician being inattentive to the test instrument configuration.(2) Maintenance technicians employ different brands of multimeters for test purposes. For different measurements, these

instruments require reversing their amperage and voltage input jacks. This, along with not paying close attention to detail, resulted in the instrument's inadvertent set-up as an ammeter.

1/ H. B. Robinson Steam Electric Plant, Unit No. 2, is a Westinghouse Pressurized Water Reactor nuclear power plant, in commercial operation since March 1971.

2/ Cause Code: A.

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Additionally, based on an event five days later on March 4, 1989, again in which steam dump actuation occurred, there appeared to be a problem in the steam dump logic. Specifically, the steam dump valves apparently tripped open with no subsequent modulation to close once demand for steam dump diminished. This caused a higher than normal steam flow which was a factor in reaching the SI setpoint.

Subsequent troubleshooting revealed that the steam dump signal summator had saturated. This was caused by the hogan racks (power supply) being deenergized and then reenergized for the RCS Resistance Temperature Detector (RTD) Bypass Manifold piping removal during the recent Refueling Outage.(3) Saturation of this signal summator produced a full output signal which resulted in the inability of the steam dump valves to properly modulate.

III. Analysis of Event

The signal that actuated the safeguard systems is designed to detect and mitigate the consequences of a steam line break. This event did not involve a steam line break; therefore, the SI and subsequent reactor trip were of no impact on safety other than an unnecessary challenge to systems. Plant safeguard systems performed as designed throughout the event. Plant Operations personnel maintained the safety of the Plant in accordance with established procedures.

IV. Corrective Actions

Human factors concerns considered attributable to this incident include the different brands of multimeters used by the I&C technicians having opposite test jack locations. To reduce the potential for this type of event to recur, I&C technicians have been instructed to remove the amp test input fuse, which is seldom used. Additionally, other test equipment that can be used in a similar capacity has been evaluated and preventive measures taken.

Although the actions taken will reduce the possibility of this event to recur, the first line of defense is the awareness required of the I&C Technicians when using test equipment. The technician responsible for this incident has met with other Maintenance crews to make them aware of the need for close attention to detail and proper test equipment configuration. The technician has also met with licensee Management to discuss the event and provide information to help preclude recurrence.

3/ Plant Modification, MOD-959, "RCS Bypass RTDs."

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The steam dump problem was thoroughly investigated following the March 4 incident. Due to the reduced power level at the beginning of the February 27 event, it appeared that the steam dump system operated properly, but did not respond quickly enough to the opening of the governor valves. Initial investigation and troubleshooting indicated that the steam dump signal summator had failed to a full output signal. At that time, the signal summator was replaced and satisfactorily tested.

Subsequent investigation revealed that the full output signal was the result of the saturation of the signal summator. This was caused by the hogan racks (power supply) being deenergized and reenergized for the RCS RTD Bypass Manifold piping removal during the recent Refueling Outage. It was also determined that both the original and replacement signal summators are susceptible to saturation; however, since this summator will not be deenergized during normal operation, a failure by saturation will not occur during power operation. The supplier of the signal summator has indicated that this problem can be eliminated by the addition of a capacitor. This upgrade should not effect the normal operation of the component. The required parts have been ordered and will be installed during the next appropriate outage after the parts have been received.

V. Additional Information

A. Failed Component Identification

Steam Dump Logic Summator No. TM-408J

B. Previous Similar Events

None

ATTACHMENT 1 TO 8906120260 PAGE 1 OF 1

CP&L
Carolina Power & Light Company

ROBINSON NUCLEAR PROJECT DEPARTMENT
POST OFFICE BOX 790
HARTSVILLE, SOUTH CAROLINA 29550

JUN. 05 1089

Robinson File No: 13510C Serial: RNPD/89-1912
(10 CFR 50.73)

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT 89-004-01

Gentlemen:

The enclosed Supplemental Licensee Event Report (LER) is submitted in accordance with 10 CFR 50.73 and NUREG-1022 including Supplements No. 1 and 2. This report adds supplemental information regarding the root cause of one of the causal factors related to the event. The revised portions of the report are indicated by a right-hand margin bar. This submittal should replace existing copies of the original report of March 29, 1989.

Very truly yours,

R.E. Morgan
General Manager
H. B. Robinson S. E. Plant

CTB:lko

Enclosure

cc: Mr. S. D. Ebnetter
Mr. L. W. Garner
INPO

*** END OF DOCUMENT ***
